OCT 1 5 1985

COMPLETED

C 3.158: MA 36A (84)-1

CURRENT INDUSTRIAL REPORTS

Switchgear, Switchboard Apparatus, Relays, and Industrial Controls

IES 30

ORIGINAL

1984

MA36A(84)-1
Issued October 1985

U.S. Department of Commerce
BUREAU OF THE CENSUS

SUMMARY OF FINDINGS

During 1984 the total value of shipments of switchgear and switchboard apparatus totaled $4,920.7 million. The 1984 total included switchgear, $1,011.6 million; power circuit breakers, $386.4 milllion; low voltage panelboards, $1,548.6 million; low voltage fuse equipment, $358.8 million; duct, $132.2 million; and control circuit relays, $488.5 million. Manufacturers' shipments of industrial controls for 1984 amounted to $4,367.4 million. A description of the survey methodology and related information appear on page 9.

Table 1. VALUE OF SHIPMENTS OF SWITCHGEAR, SWITCHBOARD APPARATUS, RELAYS, AND INDUSTRIAL CONTROLS: 1975 to 1984

(Millions of unadjusted dollars)

Product code	Product description	1984	1983	1982	1981	1980	1979	1978	1977	1976	1975
36139[1]	Switchgear, except ducts and relays....	1,011.6	1,020.5	1,211.9	[2]1,174.6	1,222.4	1,093.0	960.2	845.1	779.9	[illegible]9.0
36132	Power circuit breakers.....	386.4	380.8	388.3	356.0	366.3	334.6	284.1	260.5	240.6	235.8
36133	Low-voltage panelboards.....	1,548.6	1,334.0	1,244.2	1,306.6	1,170.3	1,151.2	1,018.3	873.6	717.5	684.7
36134	Fuses and fuse equipment.....	358.8	306.9	274.6	297.6	315.0	226.2	190.1	189.0	150.8	135.0
36135	Molded case circuit breakers.....	994.6	929.7	710.9	869.8	735.8	647.9	588.6	511.1	402.8	334.1
36136	Duct, 1,000 volts and under.....	132.2	124.8	157.8	171.2	162.9	140.9	109.5	84.0	66.3	71.2
36138[1]	Relays, control circuit.....	488.5	491.5	487.3	609.9	379.8	344.7	380.9	344.0	315.1	263.8
36794[3]	Relays, general purpose.....	580.3	523.8	281.9	244.5	243.2	198.6	177.7	174.0	82.1	72.7
3622[1]	Industrial controls.....	4,367.4	3,703.5	3,752.0	4,290.4	3,914.1	3,295.1	2,910.8	2,364.0	1,918.8	1,837.1
36221	Specific purpose industrial controls...	1,689.1	1,333.8	1,325.8	1,343.9						
36222	General purpose industrial controls....	2,293.4	1,976.8	2,083.1	2,657.1	3,914.1	3,295.1	2,910.8	2,364.0	1,918.8	1,837.1
36223	Parts for industrial controls.....	384.9	392.9	343.1	289.4						

[1]In the 1982 Census of Manufactures the following product class changes occurred: a) product class 36131 was changed to product class 36139, b) product class 36137 was changed to product class 36138, and c) industry 3622 was split into three product classes as follows: (36221) special purpose industrial controls, (3622) general purpose industrial controls, and (36223) parts for industrial controls.

[2]Starting in 1981, data for product code 36138 31, relays, regulators, and miscellaneous switchboard devices for sale separately, formally product code 36131 31, has been moved to product class 36138 to agree with the similar changes made to the 1982 Census of Manufactures.

[3]Prior to 1984, product class 36794 general purpose relays were collected on survey MA36N, Selected Electronic and Associated Products.

Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Stephen Pope, (301) 763-5353

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

BEST COPY AVAILABLE

Table 2. SHIPMENTS OF SWITCHGEAR, SWITCHBOARD APPARATUS, RELAYS AND INDUSTRIAL CONTROLS: 1984 and 1983

(Quantity in thousands of units; value in thousands of dollars)

Product code	Product description	Number of companies	1984		1983	
			Quantity[1]	Value	Quantity[1]	Value
36130 00	Switchgear and switchboard apparatus	(NA)	(X)	4,920,736	(X)	4,588,143
36139 00	Switchgear, except ducts and relays[2]	161	(X)	1,011,628	(X)	1,020,505
36139 07	Automatic and manual control panels (generators, transformers, feed-control, etc.)	88	(X)	[4]253,175	(X)	[r]236,841
36139 09	Metal-clad switchgear (using power circuit breakers, oil and oilless), all voltages 1,000 volts up to and including 38 kV, excluding load interrupter switchgear	36	(X)	184,000	(X)	230,534
36139 10	Metal-enclosed load interrupter, switchgear assemblies, all voltages, including parts	47	(X)	73,456	(X)	[r]66,084
36139 13	Metal-enclosed low-voltage power circuit breaker switchgear assemblies 1,000 volts and below, including parts and excluding load interrupter switchgear	41	(X)	124,345	(X)	124,826
36139 17	Metal-enclosed bus bars when sold separately, above 1,000 volts, including isolated, segregated, nonsegregated and cable bus bars	16	(X)	23,069	(X)	[r]26,735
	Power switching equipment, including attachments, auxiliaries, but supports and fittings, and accessories, but excluding power fuses sold separately 2,300 volts and over. Also includes single phase circuit reclosers:					
36139 41	Outdoor, excluding structures	24	(X)	147,239	(X)	154,341
36139 45	Indoor	11	(X)	6,445	(X)	8,217
36139 51	Power fuses and fuse links for 2,300 volts and over, a.c. service, excluding distribution cut-outs	12	(X)	29,703	(X)	25,445
36139 81	Power and ground connectors generally used in substation construction	9	(X)	49,187	(X)	7,918
36139 91	Overhead transmission and distribution connectors (clamps, taps, terminals, and splices	6	(X)	107,543	(X)	90,686
36139 93	Transmission and distribution connectors n.e.c., including underground deadends, hot line taps stirrups, repair sleeves, etc.	8				
36139 83	Distribution cut-outs	9	(X)	53,466	(X)	[r]48,878
36132 00	Power circuit breakers, and parts, all voltages	27	(S)	386,198	(S)	380,765
36132 16	Power circuit breakers (sold separately) for use in metal-clad switchgear (oil and oilless), over 1,000 volts (number of breakers)	9	(S)	23,485	(S)	38,885
36132 17	Parts for power circuit breakers for use in metal-clad switchgear[6]	6	(X)	21,398		
36132 21	Power circuit breakers, free standing, oil and oilless, from 15.5 kV through 800 kV and above (number of breakers)	5	(S)	111,641	(S)	137,027
36132 22	Parts for power circuit breakers, free standing, oil and oilless, from 15.5 kV through 800 kV and above[6]	5	(X)	16,915		
36132 26	Power circuit breakers (sold separately) in individual enclosures and/or for use in low-voltage switchgear, 1,000 volts and below, (excluding molded case case circuit breakers) (number of breakers)[6]	15	(S)	36,579	(S)	[r]38,263
36132 27	Parts for power circuit breakers in individual enclosures and/or for use in low-voltage switchgear, 1,000 volts and below, (excluding molded case circuit breakers)[6]	3	(X)			
36132 31	All other power circuit breakers (sold separately), oil and oilless, network protectors and automatic circuit reclosers[6]	9	(S)	176,380	(S)	[r]166,590
36132 32	Parts for all other power circuit breakers, oil and oilless, network protectors and automatic circuit reclosers[6]	4	(X)			
36133 00	Low voltage panelboards, distribution boards, and other switching and interruption devices 1,000 volts and below	155	(S)	1,548,568	(S)	1,334,033
	Panelboards, including enclosing cabinets:					
36133 11	Fusible, including combination switch fuse	63	(S)	117,741	(S)	95,674
36133 12	Circuit breaker	58	(S)	260,542	(S)	233,185
	Distribution switchboards:					
36133 15	Fusible	36	(S)	99,713	(S)	95,053
36133 17	Circuit breaker	50	(S)	137,269	(S)	135,881
36133 19	Other, including theater switchboards	19	(S)	23,205	(S)	22,496
	Knife switches, enclosed:					
36133 21	Heavy duty	14	(S)	120,449	(S)	76,296
36133 22	General duty	16	(S)	55,248	(S)	43,075
	Load centers:					
36133 24	Enclosed fusible, service entrance, and branch circuit cut-outs	12	(S)	8,376	(S)	7,994
36133 26	Circuit breaker type	21	(S)	247,691	(S)	211,100
36133 32	Grouped metering panels (combinations of two or more meters and related switching units with over current protection associated with each meter, including accessory components, excluding single socket load combinations	26	(S)	63,032	(S)	43,492
36133 33	Other switches, excluding snap, toggle, push, etc., including open knife switches, motor contact, motor disconnect, meter service equipment other than meter mounting, and test devices	26	(S)	123,827	(S)	[r]100,336
36133 98	Other low voltage switchgear apparatus	48	(S)	291,475	(S)	[r]269,451
36134 00	Fuses and fuse equipment, under 2,300 volts, except power distribution cut-outs	26	(X)	358,786	(X)	306,908
36134 31	Nonrenewable plug fuses	7	(X)	415,486	(X)	14,242
36134 51	Nonrenewable cartridge fuses	11	(X)	223,470	(X)	183,648
36134 71	Renewable plug and cartridge fuses, including renewable links	9	(X)	410,602	(X)	10,473
36134 93	Other fuses and open fuse material, including cut-outs, clips, base, etc.	20	(X)	109,238	(X)	[r]98,545
36135 00	Molded case circuit breakers, 1,000 volts and under	40	(S)	994,643	(S)	929,650
	Industrial type (with or without ground fault detection capability) assembled as complete units in supporting and enclosing housing of insulating materials, with or without accessories or attachments	12	(S)	444,447	(S)	322,595
36135 14	With ground fault detection capability[6]	6	(S)	444,447	(S)	[r]322,595
36135 16	Without ground fault detection capability[6]	17				
	Residential or light duty type (with or without ground fault detection capability as an integral part) primarily for load center application, assembled as complete units in supporting and enclosing housing of insulating materials	9	(S)	255,491	(S)	352,096
36135 18	With ground fault detection capability[6]	6	(S)	43,905	(S)	352,096
36135 19	Without ground fault detection capability[6]	8	(S)	211,586	(S)	[r]6,650
36135 31	Individually enclosed industrial type, excluding panelboards and busway plugs	21	(S)	8,728	(S)	
	Other molded case circuit breakers:					
36135 91	Marine and Navy type	4	(S)	80,874	(S)	[r]87,062
36135 92	Aircraft and aerospace	3				
36135 93	Automotive	2	(S)	205,103	(S)	[r]161,247
36135 94	Electronic	1				
36135 95	All other types	11				

See footnotes at end of table.

BEST COPY AVAILABLE

Table 2. SHIPMENTS OF SWITCHGEAR, SWITCHBOARD APPARATUS, RELAYS AND INDUSTRIAL CONTROLS: 1984 and 1983--Continued

(Quantity in thousands of units; value in thousands of dollars)

Product code	Product description	Number of companies	1984		1983	
			Quantity[1]	Value	Quantity[1]	Value
36136 00	Duct including plug-in units and accessories, 1,000 volts and under	36	(S)	132,237	(S)	124,798
36136 11	Busways	34	(S)	132,237	(S)	124,798
36136 31	Trolly-type and lighting distribution duct	4				
36138 00	Relays, control circuit, and switchgear type* [1]	86	(S)	488,466	(S)	491,484
36138 31	Relays (switchgear type, excluding industrial control type); regulators and miscellaneous switchboard devices (for sale separately)	22	(S)	113,520	(S)	150,765
36138 34	Industrial control relays (all voltages) n.e.c*	63	(X)	[a]287,108	(X)	[r]280,803
36138 44	Motor control accessories, including those items which are sold separately but became part of a motor controller. Includes overload relays, auxilliary contact, heater elements, mechanical interlocks, control transformer, kits to add push buttons, selector switches, pilot lights, overload relays, separate controller enclosures and enclosure fittings, reset mechanism, etc. (excluding motor circuit switches sold separately.)*	29	(S)	87,838	(S)	59,916
36794 00	General purpose and other relays	64	(S)	580,313	(S)	523,801
	General purpose electromechanical relays:*					
	Over 100 MW actuating power and sealed (either hermetically or environmentally):*					
36794 01	0 through 2.0 amps contact rating*	9	(S)	12,701	(S)	10,753
36794 02	Over 2.0 through 10.0 amps contact rating*	12	(S)	9,766	(S)	8,806
36794 03	Over 10.0 amps contact rating*	6	(S)	27,767	(S)	7,496
	Over 100 MW actuating power and not sealed:*					
36794 04	0 through 2.0 amps contact rating*	5	(S)	(D)	(S)	(D)
36794 05	Over 2.0 through 10.0 amps contact rating*	14	(S)	10,762	(S)	8,453
36794 06	Over 10.0 through 25.0 amps contact rating*	7	(S)	9,038	(S)	6,700
36794 07	Over 25.0 contact rating*	3				
36794 08	0 through 100 MW actuating power (both sealed and not sealed)*	8	(S)	(D)	(S)	(D)
	Miniature printed circuit mounted electromechanically relays (excluding reed relays) (profile height 1/2" max.):*					
	Sealed (either hermetically or environmentally):*					
36794 09	0 through 2.0 amps contact rating*	4				
36794 12	Over 2.0 through 5.0 amps contact rating*	3	(S)	19,334	(S)	18,953
36794 14	Over 5.0 amps contact rating*	2				
	Not sealed:*					
36794 16	0 through 2.0 amps contact rating*	5				
36794 17	Over 2.0 through 5.0 amps contact rating*	3	(S)	16,582	(S)	12,230
36794 18	Over 5.0 amps contact rating*	2				
	DIP or SIP footprint:*					
36794 19	Sealed (either hermetically or environmentally)*	2	(S)	(D)	(S)	(D)
36794 20	Not sealed*	1	(S)	(D)	(S)	(D)
	Telephone relays, all types:*					
36794 22	Sealed (either hermetically or environmentally)*	5	(S)	(D)	(S)	(D)
36794 23	Not sealed*	6	(S)	(D)	(S)	(D)
	General purpose solid-state relays:*					
	Pure solid-state (excluding time delay):*					
36794 24	0 through 2.0 amps switch rating*	7	(S)	615	(S)	483
36794 25	Over 2.0 through 10.0 amps switch rating*	7	(S)	9,405	(S)	6,909
36794 26	Over 10.0 amps switch rating*	6				
	Hybrid solid-state (excluding time delay):*					
36794 27	0 through 2.0 amps switch rating*	2	(S)	(D)	(S)	(D)
36794 28	Over 2.0 through 10.0 amps switch rating*	2	(S)	(D)	(S)	(D)
36794 29	Over 10.0 amps switch rating*	3	(S)	(D)	(S)	(D)
	High performance military/aerospace/aircraft relays and contactors (generally pertaining to Mil-R5757, 6106, 19523, 25108, and 39016):*					
36794 30	Round and square can multipole airframe relays and contactors (both sealed and not sealed) (all sizes)*	1	(S)	(D)	(S)	(D)
	Crystal can types (sealed):*					
36794 31	Larger than full size*	6	267	6,823	265	7,342
36794 33	Full size*	6	628	8,905	373	7,381
36794 35	Half size*	6				
36794 38	Smaller than half size (including TO-5 package)*	3	1,875	27,404	1,075	28,288
36794 50	RF, antenna and coaxial relays (sealed and not sealed) (excluding reed relays)*	1	(S)	(D)	(S)	(D)
	Reed relays:*					
	Dry reed:*					
36794 60	Miniature size (glass length less than .85 inches)*	11	10,005	27,204	19,286	54,492
36794 61	Standard size*	14	17,183	49,579		
	Mercury wetted reed:*					
36794 62	Miniature size (glass length less than .85 inches)*	5	(D)	(D)	(D)	(D)
36794 63	Standard size*	4	(D)	(D)	(D)	(D)
36794 70	Stepping switches, stepping and impulse relays*	5	(S)	(D)	(S)	(D)
	Timing relays (timers):*					
36794 80	Solid-state/EMR combination*	13	(S)	5,454	(S)	3,320
36794 81	Solid-state-pure	7				
36794 82	All other timing relays (timers) including pneumatic, motor driven, electronic, etc.	15	(S)	15,938	(S)	14,637
36794 90	All other general purpose and special purpose relays n.e.c*	27	(S)	111,187	(S)	111,836
36794 96	Parts for general purpose and special purpose relays (sold separately)*	6				

See footnotes at end of table.

BEST COPY AVAILABLE

Table 2. SHIPMENTS OF SWITCHGEAR, SWITCHBOARD APPARATUS, RELAYS AND INDUSTRIAL CONTROLS: 1984 and 1983--Continued

(Quantity in thousands of units; value in thousands of dollars)

Product code	Product description	Number of companies	1984		1983	
			Quantity[1]	Value	Quantity[1]	Value
36222 00	General purpose industrial controls and power circuit devices[2]	325	(S)	2,293,410	(S)	1,976,780
36222 01	A.c. full voltage noncombination starters, 1,000 volts or less (excluding controls for packaged adjustable speed drives and synchronous motor starters)*	42	(S)	142,416	(S)	r237,082
	A.c. full voltage combination starters, 1,000 volts or less (excluding controls for packaged adjustable speed drives and synchronous motor starters)*	21	(S)	115,319		
36222 03	Combination starters, (less pumping panels)*	15	(S)	97,438		
36222 05	Pumping panels*	12	(S)	17,881		
36222 07	A.c. full voltage manual controllers, 1,000 volts or less*	11	(S)	20,967	(S)	9,451
36222 13	A.c. contactors, 1,000 volts or less (excluding controls for packaged adjustable speed drives and synchronous motor control)	24	(S)	73,142	(S)	r63,409
36222 14	A.c. reduced voltage controls, 1,000 volts or less (excluding synchronous motor starters)	26	(S)	27,100	(S)	25,448
36222 15	Synchronous motor starters, 1,000 volts or less, (including both full and reduced voltage)	8	(S)	3,056	(S)	r3,530
36222 16	Motor control centers, 1,000 volts or less	58	(X)	255,230	(X)	r242,182
36222 18	Starters and contactors for squirrel cage and wound rotor and synchronous and nonsynchronous motors, over 1,000 - 7,200 volts, air break, vacuum, and oil immersed	18	(S)	47,575	(S)	r80,734
36222 21	Brakes and clutches	18	(S)	47,679	(S)	34,414
	Limit switches (positioning sensors) (all voltages):*	14	(X)	75,356	(X)	r105,685
36222 32	Mechanical positioning sensors (all voltages)*	14	(X)	68,853		
36222 33	Solid-state positioning sensors (all voltages)*	16	(X)	60,781		
36222 37	All other pilot circuit devices (excluding relays and limits switches)*	13	(X)	23,178	(X)	94,568
36222 38	D.c. power circuit devices (all voltages)*	11	(X)	56,845		
36222 39	Other control sensors (all voltages)*					
36222 44	Pushbuttons and pushbutton stations but excluding operators' desks and stations	51	(X)	208,834	(X)	175,292
36222 81	Rheostats and resistors (except for electronic applications) sold separately n.e.c.	19	(X)	44,716	(X)	53,605
36222 96	Controls for packaged adjustable speed drives (including electronic and nonelectronic and operators' desks and stations)	47	(S)	321,035	(S)	245,605
36222 98	Solid-state controllers (all voltages)*	28	(S)	87,043	(S)	605,775
36222 99	All other general industry devices and systems*	138	(X)	614,285		
36221 00	Specific purpose industrial controls and power circuit devices[2]	216	(S)	1,689,087	(S)	1,333,804
36221 45	Marine and navy auxiliary controls and accessories	28	(S)	109,523	(S)	118,791
36221 47	Metal mill	12	(S)	48,148	(S)	70,322
36221 48	Crane and hoist controls, constant and adjustable voltage, including operators desks and stations	23	(S)	a20,098	(S)	r20,116
36221 49	Definite purpose contactors and starters	23	(S)	68,662	(S)	r58,961
	Machine tool applications:					
	Controls for numerically controlled machine tools:	21	(S)	18,254	(S)	14,380
36221 51	Positioning type	15	(S)	155,127	(S)	r105,049
36221 55	Continuous path type	24	(S)	36,460	(S)	r32,410
36221 59	Digital readout systems, including dial and plug board type	45	(S)	75,882	(S)	53,412
36221 65	Machine tool controls other than numerically controlled machines	56	(S)	621,780	(S)	447,158
36221 71	Programmable controllers (sold separately)					
36221 76	Other specific or special purpose a.c. and d.c. controllers, other definite purpose devices	135	(S)	535,153	(S)	413,205
36223 00	Renewal parts for industrial control equipment[2]	158	(S)	384,854	(S)	r392,866

Note: The percent of estimation of each item is indicated as follows (see "Description of Survey" for a discussion of estimation of missing reports): [a]10 to 25 percent of this item is estimated.

* New or revised for 1984. (D) Data withheld to avoid disclosing figures for individual companies. (NA) Not available. N.e.c. Not elsewhere classified. rRevised by 5 percent or more from previously published figures. (S) Suppressed because the data did not meet publication standards of the Bureau of the Census. This was the first year quantity data was collected on this survey. (X) Not applicable.

[1]Quantity was estimated for several companies who reported value only. These quantities were estimated on the basis of the mean unit value, which was obtained from companies reporting both quantity and value for a product line.

[2]See footnote 1 on table 1.

Table 3. VALUE OF SHIPMENTS OF SWITCHGEAR, SWITCHBOARD APPARATUS, RELAYS, AND INDUSTRIAL CONTROLS: ANNUAL SURVEY MA36A COMPARED WITH 1982 CENSUS OF MANUFACTURES

(Millions of dollars)

Product code	Product description	MA36A[1]		1982	
		1984	1983	MA36A	Census of Manufactures
3613	Switchgear and switchboard apparatus	(X)	(X)	(X)	4,760.6
36139	Switchgear, except ducts and relays	1,011.6	1,020.5	1,211.9	1,230.5
36132	Power circuit breakers, all voltages	386.4	380.8	388.3	394.6
36133	Low voltage panelboards, 1,000 volts and below	1,548.6	1,334.0	1,244.3	1,299.5
36134	Fuses and fuse equipment under 2,300 volts	358.8	306.9	274.6	280.6
36135	Molded case circuit breakers, 1,000 volts and below	994.6	929.7	710.9	711.1
36136	Duct, 1,000 volts and under	132.2	124.8	157.8	162.5
36138	Relays, control circuit, and switchgear type	488.5	491.5	487.3	497.1
36794	Relays, general purpose	580.3	523.8	261.9	263.2
36130 00	Switchgear and switchboard apparatus n.s.k., typically for establishments with 10 employees or more	(2)	(2)	(2)	129.2
36130 02	Switchgear and switchboard apparatus n.s.k., typically for establishments with less than 10 employees				55.6
3622	Industrial controls	4,367.4	3,703.5	3,752.0	4,376.1
36221	Specific purpose industrial controls	1,689.1	1,333.8	1,325.8	1,406.7
36222	General purpose industrial controls	2,293.4	1,976.8	2,083.1	2,171.8
36223	Parts for industrial controls	384.9	392.9	343.1	344.5
36220 00	Industrial controls n.s.k., typically for establishments with 10 employees or more	(2)	(2)	(2)	344.3
36220 02	Industrial controls n.s.k., typically for establishments with less than 10 employees				108.8

Note: In the 1982 Census of Manufactures, shipments data for small establishments (typically those with fewer than 10 employees) were estimated from administrative records data rather than collected on census questionnaires. These shipments are included in product codes 36130 02 and 36220 02. Products not adequately identified were coded to the industry (four-digits) followed by "000."

N.s.k. Not specified by kind. (X) Not applicable.

[1] Data from the 1983 and 1984 Annual Surveys of Manufactures will be released at a later date.
[2] Detail data available only for the census of manufactures. A substantial portion of these data are derived from administrative records. See note above.

BEST COPY AVAILABLE

Table 4. SHIPMENTS, EXPORTS, IMPORTS, AND APPARENT CONSUMPTION OF SWITCHGEAR, SWITCHBOARD APPARATUS, RELAYS, AND INDUSTRIAL CONTROLS: 1984 AND 1983

(Value in thousands of dollars)

Product code[1]	Product description	Manufacturers' shipments[1] (value f.o.b. plant)	Exports of domestic merchandise[1]		Percent exports to manufacturers' shipments	Imports for consumption[1,4]	Apparent consumption[5]	Percent imports to apparent consumption
			Value at port[2]	Estimated producers' value[3]				
	1984							
36139 07, 09, 10, 13, 17, 41, 45 36133 98	Switchgear and switchgear assemblies	1,130,204	40,664	37,557	3	16,088	1,108,735	2
36139 51	Power fuses	29,703	8,794	8,122	27	346	21,927	2
36132 16, 17, 21, 22, 26, 27, 31, 32	Power circuit breakers	386,398	130,640	120,659	31	48,765	314,504	16
36135 14, 16, 18, 19, 31, 91, 92, 93, 94, 95	Molded case circuit breakers	994,643	50,637	46,768	5	19,814	967,689	2
36133 21, 22	Knife switches	175,697	5,620	5,191	3	2,171	172,677	1
36134 31, 51, 71, 93	Fuses for circuits of less than 2,300 volts	358,796	38,685	35,729	10	18,658	341,725	5
36133 11, 12, 15, 17,19	Low-voltage panelboards and distribution boards	638,470	45,109	41,663	7	14,774	611,581	2
36794 01, 02, 03, 04, 05, 06, 07, 08	Relays, general purpose and control	955,259	73,080	69,302	7	222,576	1,108,533	20
36138 34, 44 36222 01, 03, 05, 13, 15, 18	Motor starters and contactors	496,827	18,624	17,223	3	19,203	498,807	4
36222 16	Motor control centers	255,230	13,195	12,203	5	14,641	257,668	6
	1983							
36139 07, 09, 10, 13, 17, 41, 45 36133 98	Switchgear and switchgear assemblies	1,117,029	61,258	56,651	5	12,988	1,073,366	1
36139 51	Power fuses	25,445	7,147	6,609	26	285	19,121	2
36132 16, 17, 21, 22, 26, 27, 31, 32	Power circuit breakers	380,765	128,602	118,931	31	50,169	312,003	16
36135 14, 16 18, 19, 31, 91, 2, 93, 94, 95	Molded case circuit breakers	929,650	59,719	55,228	6	16,845	891,267	2
36133 21, 22	Knife switches	119,371	6,394	5,913	5	2,131	115,589	2
36134 31, 51, 71, 93	Fuses for circuits of less than 2,300 volts	306,908	33,399	30,887	10	15,529	291,550	5
36133 11, 12, 15, 17,19	Low-voltage panelboards and distribution boards	582,289	46,161	42,690	7	12,286	551,885	2
36794 01, 02, 03, 04, 05, 06, 07, 08	Relays, general purpose and control	864,520	64,448	61,116	7	131,966	935,370	14
36138 34, 44 36222 01, 03, 05, 13, 15, 18	Motor starters and contactors	384,755	16,688	15,433	4	15,152	384,474	4
36222 16	Motor control centers	242,182	11,589	10,718	4	8,439	239,903	4

[1] For comparison of product codes, Schedule B export numbers, and TSUSA import numbers, see table 5.

[2] Source: Bureau of Census report EM 546, U.S. Exports.

[3] These values were derived by use of adjustment factors to exclude freight, insurance, and other charges incurred in moving goods to the port of export. This adjustment is made to convert the values to an approximation of the producers' value of exported goods. Current adjustment factors are based on data for 1981 which are published in Origin of Exports of Manufactured Products, MR1(AS)-5, appendix B. The adjustment factor for this report is 0.9236 except for motor starters and contactors and motor control centers for which the factor is 0.9248, and relays for which the factor is 0.9483.

[4] Source: Bureau of Census reports IM 145-X, U.S. General Imports, and IM 146, U.S. Imports for Consumption.

[5] Apparent consumption is derived by subtracting exports from the sum of manufacturers' shipments plus imports.

BEST COPY AVAILABLE

Table 5. COMPARISON OF STANDARD INDUSTRIAL CLASSIFICATION CODES SCHEDULE B EXPORT NUMBERS, AND TSUSA IMPORT NUMBERS: 1984

Product code	Product description	Export number[1]	Product description	Import number[2]	Product description
	Switchgear, except ducts and relays:		Switchboards and switchgear assemblies:	685.9061	Switchgear assemblies and switchboards in
36139 07	Automatic and manual control panels	685.9061	Switchgear assemblies and switchboards in circuits of not over 1,000 volts		circuits of not over 1,000 volts
36139 09	Metal-clad switchgear (using power circuit breakers, oil and oilless); all voltages, above 1,000 volts up to and including 38 kV, excluding load interrupter switchgear	685.9063	Switchgear assemblies and switchboards in circuits of over 1,000 volts	685.9063	Switchgear assemblies and switchboards in circuits of over 1,000 volts
36139 10	Metal-enclosed load interrupter switchgear assemblies, all voltages, including parts				
36139 13	Metal-enclosed low-voltage power circuit breaker switchgear assemblies, 1,000 volts and below, including parts and excluding load interrupter switchgear				
36139 17	Metal-enclosed bus when sold separately, above 1,000 volts, including isolated, segregated, nonsegregated, and cable bus.				
	Power switching equipment (including attachments, auxiliaries, bus supports and fittings, and accessories, but excluding power fuses sold separately), 2,300 volts and over. Also includes single phase circuit reclosers.				
36139 41	Outdoor, excluding structures				
36139 45	Indoor				
36139 98	Other low voltage switchgear apparatus				
	Relays, general purpose:				
	Over 100 MW actuating power and sealed:				
36794 01	0 - 0.2 amps				
36794 02	2.0 - 10.0 amps				
36794 03	Over 10.0 amps				
	Over 100 MW actuating power and not sealed:	685.9034	Relays, less than 10 amps	685.9034	Relays, less than 10 amps
36794 04	0 - 0.2 amps	685.9036	Relays, 10 amps and over	685.9036	Relays, 10 amps and over
36794 05	2.0 - 10.0 amps				
36794 06	10.0 - 25.0 amps				
36794 07	Over 25.0 amps				
36794 08	0 - 100 MW actuating power (sealed and not sealed)				
36131 51	Power fuses and fuse links for 2,300 volts and over, a.c. service (excluding distribution cutouts)	685.9044	Fuses, in circuits of 2,300 V or more	685.9044	Fuses, in circuits of 2,300 volts or more
	Power circuit breakers, all voltages:		Electrical switches and relays:		Electrical switches and relays:
36132 15	Power circuit breakers (sold separately) for use in metal-clad switchgear (oil and oilless), over 1,000 volts, including parts		Containing an automatic overload or tripping mechanism (circuit breakers)		Containing an automatic overload or tripping mechanism (circuit breakers)
			Other:		Other:
36132 20	Power circuit breakers, free standing, oil and oilless, from 15.5 kV through 800 kV and above, including parts	685.9004	In circuits of less than 1,000 volts	685.9004	In circuits of less than 1,000 volts
		685.9006	In circuits of 1,000 volts or more, but less than 345 kV	685.9006	In circuits of 1,000 volts or more, but less than 345 kV
36132 25	Power circuit breakers (sold separately) in individual enclosures and/or for use in low-voltage switchgear, 1,000 volts and below, including parts (excluding molded case circuit breakers)	685.9010	In circuits of 345 kV or higher	685.9008	In circuits of 345 kV or higher
		685.9087	Parts of circuit breakers		
36132 30	All other power circuit breakers (sold separately), oil and oilless, network protectors and automatic circuit reclosers, including parts				
	Molded case circuit breakers, 1,00 volts and under:	685.9002	Molded case	685.9002	Molded case
36135 11	Industrial type (with or without ground fault detection capability) assembled as complete units in supporting and enclosing housing of insulating materials; with or without accessories or attachments				
36135 12	Residential or light duty type (with or without ground fault detection capability as an integral part) primarily for load center application, assembled as complete units in supporting and enclosing housing of insulating materials				
36135 31	Individually enclosed industrial type (excluding panelboards and busway plugs)				
	Other molded case circuit breakers:				
36135 91	Marine and Navy types				
36135 92	Aircraft and aerospace				
36135 93	Automotive				
36135 94	Electronic				
36135 95	All other types				
	Switches (except switches commonly known as snap, toggle, and rotary switches and switch devices intended primarily to be used with electric motor controls):		Other:		Other:
			Knife:		Knife:
	Knife switches, enclosed:	685.9028	In circuits of 1,000 volts or less	685.9028	In circuits of 1,000 volts or less
		685.9032	In circuits of over 1,000 volts	685.9032	In circuits of over 1,000 volts
36133 21	Heavy duty				
36133 22	General duty				
	Fuses and fuse equipment, under 2,300 volts, (except power distribution cutouts)		Fuses:		Fuses:
			In circuits of less than 2,300 volts:		In circuits of less than 2,300 volts:
36134 31	Nonrenewable plug fuses	685.9039	Glass cartridge	685.9039	Glass cartridge
36134 51	Nonrenewable cartridge fuses	685.9042	Other	685.9042	Other
36134 71	Renewable plug and cartridge fuses (including renewal links)				
36134 93	Other fuses and open fuse material (including cutouts, clips, bases, etc.)				

See footnotes at end of table.

BEST COPY AVAILABLE

Table 5. COMPARISON OF STANDARD INDUSTRIAL CLASSIFICATION CODES SCHEDULE B EXPORT NUMBERS, AND TSUSA IMPORT NUMBERS: 1983--Continued

Product code	Product description	Export number[1]	Product description	Import number[2]	Product description
	Low voltage panelboards and distribution boards and other switching and interrupting devices 750 volts and below:	685.9066	Panelboards and distribution boards in circuits not over 1,000 volts	685.9066	Panelboards and distribution boards in circuits not over 1,000 volts
	Panelboards (including enclosing cabinets):				
36133 11	Fusible				
36133 12	Circuit breaker				
	Distribution switchboards:				
36133 15	Fusible				
36133 17	Circuit breaker				
36133 19	Other (including theater switchboards)				
	General industry power circuit devices, controls, and parts:		A.c. motor starters and contactors:		A.c. motor starters and contactors:
	General industrial controls:	685.9070	Rated not over 600 volts	685.9070	Rated not over 600 volts
36222 12	A.c. full voltage starters, 600 volts or less, (excluding controls for packaged adjustable speed drives and synchronous motor starters)	685.9072	Rated over 600 volts	685.9072	Rated over 600 volts
36222 13	A.c. contactors, 600 volts or less, (excluding controls for packaged adjustable speed drives and synchronous motor field controls)				
36222 15	Synchronous motors, over 600 volts, air break and oil immersed				
			A.c. motor control centers:		
36222 16	Motor control centers, 600 volts or less	685.9073	Not over 600 volts	685.9074	A.c. motor control centers

[1]Source: 1984 edition, Schedule B, Statistical Classification of Domestic and Foreign Commodities Exported from the United States.
[2]Source: 1984 edition, Tariff Schedules of the United States Annotated.

BEST COPY AVAILABLE

DESCRIPTION OF SURVEY

Scope of Survey. This survey covers manufacturers of switchgear, switchboard apparatus, relays, and industrial controls, except very small firms (generally less than 10 employees) for which 1982 Census of Manufactures data were derived from administrative records of other government agencies.

Survey Methodology. The statistics in this publication were collected by mail on Bureau of the Census annual Form MA36A, Swithgear, Switchboard Apparatus, Relays, and Industrial Controls. The survey panel includes all known manufacturers of switchgear, switchboard apparatus, relays, and industrial controls, except the very small firms excluded from the scope of the survey. Approximately 1,100 companies are included. No estimate is derived for the small firms excluded from the survey.

Reliability of Data. Survey error may result from several sources: (1) inability to obtain information about all cases in the survey; (2) response errors; (3) definitional difficulties; (4) differences in the interpretation of questions; (5) mistakes in recording or coding the data obtained; and (6) other errors of collection, response, coverage, and estimation for missing data. These nonsampling errors also occur in complete censuses. Although no direct measurement of the biases due to nonsampling errors has been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data in an effort to minimize their influence.

A major source of bias in the published estimates is due to imputing data for nonrespondents, for late reporters, and for data which fail logic edits. Missing figures are imputed based on yearly movements shown by reporting firms. Imputation generally is limited to a maximum of 10 percent for any one data cell. Figures with imputation rates greater than 10 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse, because the actual yearly movements for nonrespondents may or may not closely agree with the imputed movements. The range of difference between the actual and imputed figures is not precisely known, but is assumed to be small. The degree of uncertainty regarding the accuracy of the published data increases as the percentage of imputation increases. Figures with imputation rates above 10 percent should be used with caution.

Revisions to Previous Period Data. Statistics for previous years may be revised as the result of corrected data from respondents, late reports for which imputations were made as described above, or other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Revisions include changes to prior period data resulting from reconciliation of the results of this survey with the 1982 Census of Manufactures to correct differences in reported data between the two series and to identify and verify new establishments included in the scope of this survey. Table 3 presents a comparison of data from the two series by census product class following the reconciliation.

Adjustment for Price Change. All dollar figures included in this publication are in current dollars; i.e., they have not been adjusted for price change.

EXPLANATION OF TERMS

Value of Shipments. Represents the value of physical shipments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale. The value represents the net sales price, f.o.b. plant, to the customer or branch to which the products are shipped, net of discounts, allowances, freight charges, and returns. Shipments to a company's own branches are assigned the same value as comparable sales to unaffiliated customers; i.e., the value includes an appropriate allocation of company overhead and profit. Products bought and resold without further manufacture are excluded.

Relay. A device that is operative by a variation in the conditions of one electric circuit to effect the operation of other devices in the same or another electric circuit.

Control Relay. A relay which functions to initiate or to permit the next desired operation in a control circuit or scheme.

Overload Relay. A relay which functions at a predetermined value of current (overcurrent relay).

Busway. A prefabricated electric distribution system consisting of bus bars in a protective enclosure together with associated fittings. All busways include, as a minimum, bus bar, some supporting means for these bars, and a housing around them.

General Industry Controls

Industry Control Pushbuttons, Selector Switches, Pilot Lights, and Foot Switches (All Voltages). AC or DC manually operated devices designed primarily to operate in the control circuits of industrial applications. Includes control stations, reed devices, and rotary switches with control circuit ratings. Excludes metal mill and crane accessories and similar items incorporated in products covered by other categories, such as conversion kits for starters, and those designed for aircraft, appliances, business machines, computers, or elevator applications.

Industrial Control Relays (All Voltages). AC and DC operated electromagnetic relays designed primarily to perform logic functions and/or operate in the control circuits of industrial applications. Includes reed devices and relays which carry ratings in addition to those applicable to control circuits and relays with mounted timer attachments. Excludes timer attachments sold separately, relays designed for use with metal mill or crane control, and relays incorporated in products covered by other categories. Also excludes relays designed for military applications or for the appliance or television industries.

BEST COPY AVAILABLE

Motor Controller Accessories. Items which are sold separately but become part of a motor controller. Includes overload relays, auxiliary contact, heater elements, mechanical interlocks, control transformer, kits to add pushbuttons, selector switches, pilot lights, overload relays, separate control enclosures and enclosure fittings, reset mechanisms, etc. Excludes motor circuit switches sold separately.

AC Full Voltage, Noncombination Magnetic Starters (1,000 Volts or Less). Electromagnetic switches with overload protection rated in amperes, horsepower, or kilowatts for application at full voltage with nonsynchronous motors. Includes open and enclosed; single- and multiple-speed; reversing and nonreversing; electrically, mechanically, or magnetically held; AC or DC operated; and controls for one or more squirrel cage or wound rotor motors. Excludes those starters which qualify for any specific application item.

AC Full Voltage, Combination Magnetic Starters (1,000 Volts or Less). Electromagnetic switches with or without overload protection combined with a disconnect device, rated in amperes, horsepower, or kilowatts for application at full voltage with nonsynchronous motors. Includes open and enclosed; single- and multiple-speed; reversing and nonreversing; electrically, mechanically, or magnetically held; AC or DC operated; and controls for one or more squirrel cage or wound rotor motors. Variations include those with fusible or nonfusible disconnect switch or circuit breaker; and those with oil well, irrigation, or other pumping applications. Excludes those starters which qualify for any specific application item.

AC Full Voltage Manual Controllers (1,000 Volts or Less). Manual switches with or without overload protection, with or without disconnect devices, rated in amperes, horsepower, or kilowatts for application at full voltage with nonsynchronous motors. Includes open and enclosed, single- and multiple-speed, reversing and nonreversing, and controls for one or more squirrel cage or wound rotor motors. Variations include toggle switches, drum switches, and loom switches. Excludes those devises which qualify for any specific application item.

Solid-State Controllers. All primarily solid-state devices designed to operate in power circuits and directly control the single phase or polyphase power delivered to motors, ovens, furnaces, or other power-consuming devices, should be reported as an AC device, 1,000 volts or less. Included are solid-state starters and contactors, solid-state reduced voltage (current) controllers which control motor acceleration from rest to rated speed, and solid-state deceleration (braking) controllers. Excluded are those solid-state current sensing devices such as overload relays with outputs that operate in control circuits and are sold separately, resistance welding controls, adjustable speed drive controls, and any other product which qualifies for inclusion in other specific application or general industry control categories.

AC Magnetic Contactors (1,000 Volts or Less). Electromagnetic switches without overload protection and without disconnect devices rated in amperes, horsepower, or kilowatts. Includes open and enclosed; single- and multiple-speed; reversing and nonreversing; electrically, mechanically, or magnetically held; AC or DC operated, for lighting, heating motor, power distribution, or high frequency applications.

AC Reduced Voltage Magnetic or Manual Controllers (1,000 Volts or Less). Magnetic switches with or without overload protection, with or without disconnect devices, rated in amperes, horsepower, or kilowatts, which start nonsynchronous motors at reduced voltage. Includes open and enclosed, single- and multiple-speed, reversing and nonreversing types. Variations include controllers with primary or secondary resistors, reactor, autotransformer, partwinding, and stardelta starters. Excludes those devices which qualify for any specific application item.

Synchronous Motor Controllers (1,000 Volts or Less). Armature and field controls for synchronous motors, starting at full or reduced voltage. Exclude those devices which qualify for any specific application item.

Motor Control Centers (1,000 Volts or Less). Factory-built and customer assembled control centers, including the sections and units sold separately.

Medium Voltage Nonsynchronous and Synchronous Motor Controllers (Over 1,000 Through 7,200 Volts). Manual and magnetic devices for the control of squirrel cage, wound rotor, and synchronous motors. Includes open and enclosed, combination and noncombination, full or reduced voltage, reversing and nonreversing air brake, vacuum brake, and oil immersed, starters and contactors. Excludes those devices which qualify for any specific application item.

Positioning Switches (All Voltages). AC or DC switches and sensors which respond to movement or position. Includes mechanical and air operated limit switches, proximity switches, photoelectric sensors and relays, and cam switches. Excludes those devices used in or covered by solid-state control systems or specific application items.

Industrial Control Timers (All Voltages). Mechanically or electrically operated (AC or DC) timers primarily used to operate in logic and control circuits of industrial applications. Includes timing attachments used with contactors or relays; motor driven, pneumatic, and eletronic timing relays; time delay relays; and under voltage time delay relay. Excludes relays with timer attachments mounted and timers designed as solid-state logic units or for metal mill or crane applications or incorporated inproducts covered by other categories.

Resistors and Rheostats. Separate components and assemblies of carbon and metal resistors designed to function in a power or motor field circuit. Includes manual and motor operated rheostats, cast and wound metal resistors, and carbon-pile resistors. Excludes resistors designed for use in electronic circuits.

BEST COPY AVAILABLE

Miscellaneous General Application Devices (All Voltages). Mechanical and electrical devices (AC or DC) designed for general industrial application which do not qualify for classification in any other category and not used in products covered by any other category. Includes pressure, vacuum, temperature, and liquid level switches; phase or frequency sensitive relays; solenoids; magnetic unloaders; gas engine cutouts; saturating shunt; control circuit master switches; control circuit fuse blocks; sealed switches (plugging and anti-plugging); zero speed switches; motion deflectors; dimmers; and dynamic braking controls sold separately.

DC Power Circuit Devices (All Voltages). Manual and magnetic devices sold separately for the control of DC power. Includes open and enclosed, combination and noncombination, full or reduced voltage, reversing or nonreversing air brake, and oil immersed, DC power circuit devices. Excludes those devices which qualify for any specific application item.

AC or DC Friction Brakes and Clutches (All Voltages). All devices used to engage or control motion by slowing or stopping, provided the clutch or brake is operated or released electrically. Braking or clutch action may be controlled mechanically, hydraulically, or magnetically, using shoes or discs. Excludes dynamic braking controls.

Specific Application or Specific Industry Controls

AC or DC Control Panels (All Voltages). Assemblies and components in which the principal power circuits are AC or DC, for applications other than welding, marine auxiliaries, crane, hoist, or adjustable speed drives. Excludes panels which have the outputs controlled by solid-state digital logic. Specifically includes analog controllers, furnace and lifting magnet controls, regulators, and motor controls which provide for plugging and/or dynamic braking.

U.S. Coast Guard, Navy and Marine Auxiliary Controls and Accessories (All Voltages). Controllers and accessories designed to meet the requirements of the U.S. Navy, U.S. Coast Guard, and similar specifications for marine auxiliary control. Includes all AC or DC versions of such power circuit or control circuit devices for application above or below deck except adjustable speed drive controls and solid-state digital logic systems for marine applications.

Crane and Hoist Controls (All Voltages). AC or DC control assemblies designed to control hoist, trolley, and/or bridge motion for application in mines, traffic-carrying bridges, elevators, and general industry. Includes crane protective panels, hoist or crane master switches, and adjustable speed drives for these purposes. Excludes crane and hoist controls for marine applications, pendant control stations, and other accessories sold separately.

Definite Purpose Contactors and Starters (600 Volts or Less). Definite purpose full voltage contactors and starters, including open and enclosed devices. Including, but not limited to, heating loads, lighting loads, refrigeration, solid-state starters, and contactors, etc.

Numerical Controls for Machine Tools Positioning. Numerical controls activated by direct data input, punched tape, punched cards, magnetic tape, cassette, or manual data input. Includes all controls in which point-to-point positioning and cutting or forming (regardless of the number of movement axes or auxiliary functions) are controlled automatically by means of numerical programs inserted into the systems. If a machine control permits positioning and continuous path operations, it is classified continuous path.

Continuous Path or Computer Numerical Control. Numerical program controls activated by direct data input, e.g., punched tape, punched cards, magnetic tape, cassette, or manual data input. Includes all machine controls which in addition to point-to-point positioning, the path of cutting is also automatically controlled by means of numerical programs inserted into the systems. If a machine control permits positioning and continuous path operations, it is classified continuous path.

Digital Readout Systems, Including Dial or Plugboard. Digital readout systems or dial or plugboard type of prerecorded motion programs control systems. Includes all controls in which positioning or continuous path are automatically commanded by numerical programs fed into the system by an operator through dials, plugs, switches, or any other numerical method.

Resistance Welding Control, All Voltages. Controllers and accessories for resistance welding. Includes contactors, timing devices, electronic and solid-state analog and digital controls. Excludes control for arc welding.

Metal Mill Control and Accessories (All Voltages). Any AC or DC power or control circuit device designed for and sold separately for metal mill applications. Includes master switches, limit switches (power or control circuit), timers, relays, etc.

Other Specific Purpose Equipment (All Voltages). Any industrial control equipment designed for a specific application which is not covered by any other category, such as aircraft contractors and controllers rated 601V up to 2200V, dynamic braking controls sold separately, dimmers, and automatic transfers switches.

AC and DC Adjustable Speed Drive Control (All Voltages). The control portion of adjustable (regulated) speed drives for controlling motors by adjusting voltage or adjusting frequency. Includes single- and multimotor drive controls, eddy current coupling drives, all elements of the power units (except motor generators), and all auxiliary controls sold as part of the drive system. Excludes rotating equipment.

All Other General Industry Devices and Systems. Solid-state digital panels using either wired or retentive memory logic to provide data or control processes or machine functions systems which are not elsewhere classified.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; on the other hand, the export and import classification system is more materials oriented. Aside from the differences in the basic commodity classifications, there are additional problems involving import data, since there are a substantial number of imported commodities which are not produced in the United States or which are produced only in very small quantities and which, therefore, have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to the problems mentioned above, there are also the following problems affecting the comparability of the three sets of data.

Valuation. There are different methods of valuation for the three types of data:

- *Domestic Output*— Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.

- *Exports*— Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance and other charges to the export point.

  Estimated producers' values of exports have also been developed. These values more closely approximate the values reported for domestic output because they exclude freight, insurance, and other charges applied from the producing plant to the export point.

- *Imports*— Valued at the first port of entry in the United States. It includes c.i.f. (cost, insurance, and freight), duty, and other charges to the import point.

Duplication in Quantity and Value of Output. Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at four-digit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

Low-Value Export and Import Transactions. Detailed commodity information is not included for individual import shipments valued at not more than $250 or for individual export shipments valued at not more than $500. This is believed to have only negligible effects on the statistics for the bulk of the commodities.

Manufacturers' Shipments, Not Specified by Kind. The value of manufacturers' shipments at the four-digit industry level often includes a small amount which is not distributed among the individual five-digit product classes. Export and import percentages at the more detailed levels might, therefore, be slightly overstated.

Time Lag Between Output and Exports. There will be a lag between the time a commodity is produced or shipped by the producer and the time it is actually exported, especially when intermediaries (wholesalers, exporters, etc.) are involved. Ordinarily, this type of discrepancy is insignificant in annual figures.

"Direct" vs "Total" Commodity Exports and Imports. Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

Used Commodities. With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

Geographic Area of Coverage. Import and export data reflect the movement of merchandise into and out of U.S. foreign trade zones, the U.S. Virgin Islands, and the U.S. customs territory (includes the 50 States, the District of Columbia, and Puerto Rico).

HISTORICAL NOTE

Data on switchgear, switchboard apparatus relays, and industrial controls have been collected by the Bureau of the Census since 1971. Historical data may be obtained from Current Industrial Reports available at your local Federal Depository Library. A list of these libraries may be obtained from the Bureau of the Census regional offices:

Atlanta, Georgia	(404) 881-2271
Boston, Massachusetts	(617) 223-2327
Charlotte, North Carolina	(704) 371-6142
Chicago, Illinois	(312) 353-6251
Dallas, Texas	(214) 767-0621
Denver, Colorado	(303) 234-3924
Detroit, Michigan	(313) 226-7742
Kansas City, Kansas	(816) 374-4601
Los Angeles, California	(213) 209-6616
New York, New York	(212) 264-3860
Philadelphia, Pennsylvania	(215) 597-4920
Seattle, Washington	(206) 442-7828

RELATED REPORTS

The Bureau of the Census publishes the following related reports:

Series	Frequency	Title
Current Industrial Reports		
MQ35W	Quarterly	*Metalworking Machinery*
MA36K	Annually	*Wiring Devices and Supplies*
MA36H	Annually	*Motors and Generators*
MA36N	Annually	*Selected Electronic and Associated Products, Including Telephone and Telegraph Apparatus*
MA38B	Annually	*Selected Instruments and Related Products*
Other Industry Reports		
M3-1	Monthly	*Manufacturers' Shipments, Inventories, and Orders*
(AS)	Annually	Annual Survey of Manufactures (ASM)
(MC)	Quinquennially	Census of Manufactures
Foreign Trade Reports		
FT410	Monthly	*U.S. Exports—Schedule E—Commodity by Country*
FT135	Monthly	*U.S. General Imports—Schedule A—Commodity by Country*

CONTACTS FOR DATA USERS

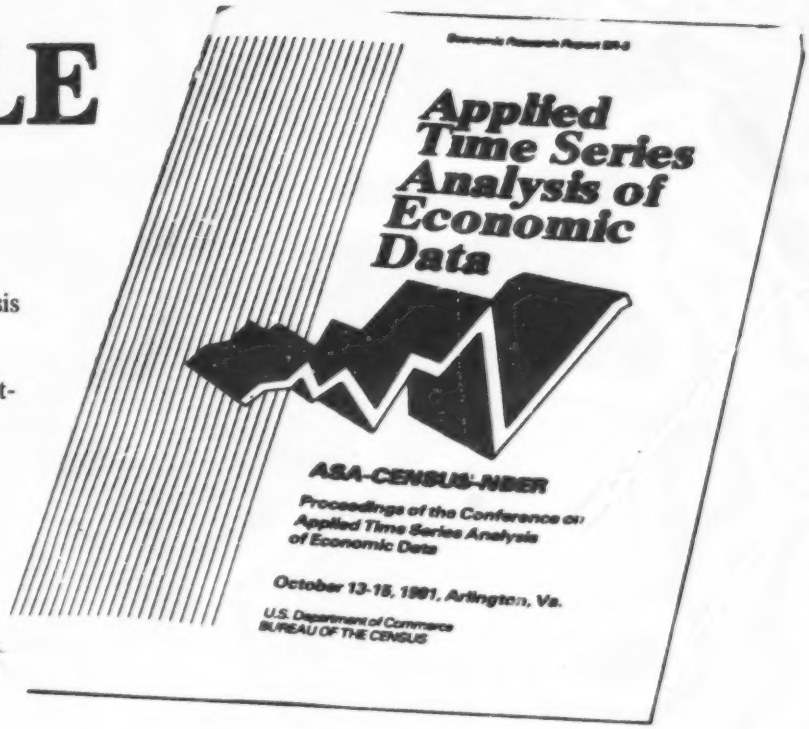
Subject Area	Contact	Phone Number
Current Industrial Report MA36A	Stephen Pope	(301) 763-5353
Foreign Trade publications	Paul E. Herrick	(301) 763-5200
Census/ASM	Ted McGrath	(301) 763-5752
To order a Census Bureau publication	Customer Services (DUSD)	(301) 763-4100
International Trade Administration	Dick Whitley	(202) 566-7449

ACKNOWLEDGMENTS

This report was prepared in the Industry Division, Bureau of the Census, under the direction of Malcolm E. Bernhardt, Chief, Current Durables Branch, and Kenneth McBeth, Chief, Electrical and Electronics Equipment Section. Stephen M. Pope was directly responsible for the review of the data and preparation of the report. Gaylord Worden, Chief of the Division, and Thomas L. Mesenbourg, Assistant Chief for Current Industrial Reports, provided overall direction and coordination to this project.

BEST COPY AVAILABLE

NOW AVAILABLE


Applied Time Series Analysis of Economic Data
ASA-CENSUS-NBER
Proceedings of the Conference on Applied Time Series Analysis of Economic Data
October 13-15, 1981, Arlington, Va.
U.S. Department of Commerce
BUREAU OF THE CENSUS

This publication presents the proceedings of the Conference on Applied Time Series Analysis of Economic Data held in October 1981 and cosponsored by the American Statistical Association; Bureau of the Census, U.S. Department of Commerce; and National Bureau of Economic Research.

Topics highlighted include:

- **Modeling seasonal economic data**
- **Modeling univariate economic time series**
- **Modeling multiple economic time series**
- **Modeling business cycle and expectations data**
- **Modeling and forecasting economic variables**
- **Modeling and analyzing preliminary and revised economic data**

Applied Time Series Analysis of Economic Data (Economic Research Report, ER-5) is now available from the Bureau of the Census.

(please detach along this dotted line)

ORDER FORM

Please send me____copy(ies) of Applied Time Series Analysis of Economic Data, ER-5, at $7.

MAIL ORDER FORM WITH PAYMENT TO

Data User Services Division
Customer Services (Publications)
Bureau of the Census
Washington, D.C. 20233

MAKE CHECK OR MONEY ORDER PAYABLE TO SUPERINTENDENT OF DOCUMENTS

(please type or print)

Name _____

Organization _____

Street Address _____

City, State, and ZIP Code _____

TOTAL AMOUNT $

Payment enclosed (Mark one)

- ☐ Check
- ☐ Money order
- ☐ GPC coupons

OR

Charge to: Superintendent of Documents Deposit Account Number

_____

BEST COPY AVAILABLE